

Smart Methods AI Task One - ROS Installation

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ROS is preferred to run on Linux OS, thus, the installation is split into two parts. First, installing Linux. Second, installing ROS on Linux.

Installing Linux – Ubuntu 20.04:

ROS Noetic is supported by Ubuntu 20.04

Start by installing a Virtual Machine to run Linux. I choose Oracle VM.

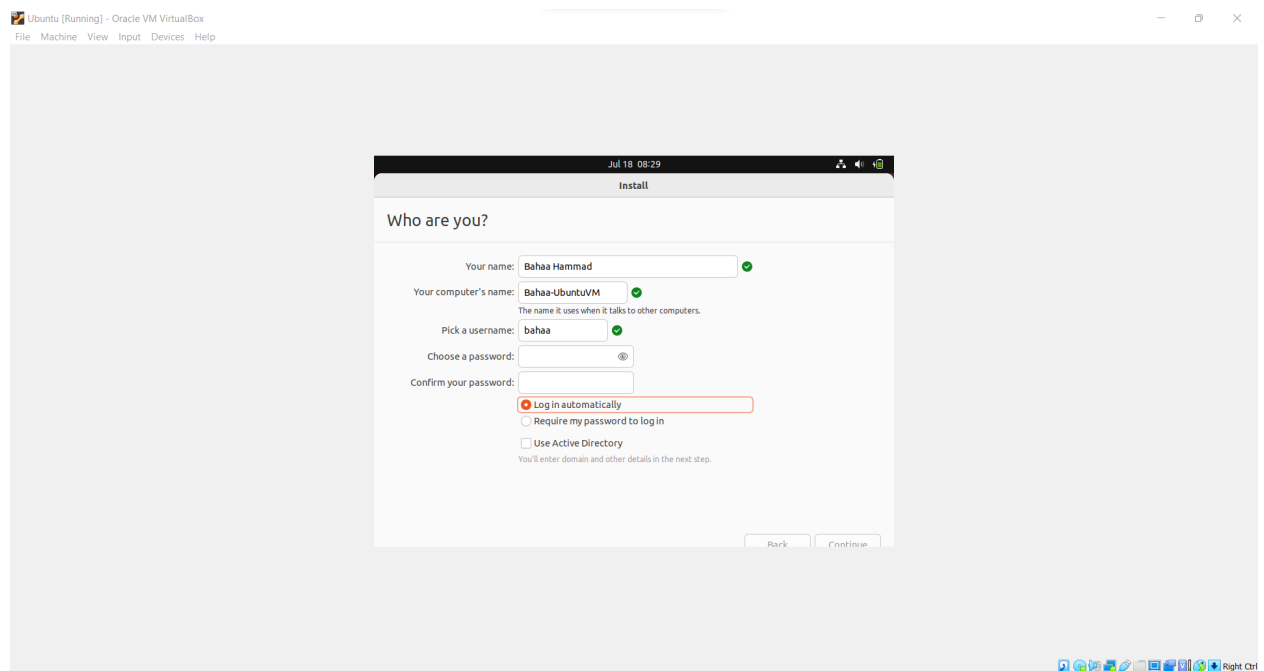
<https://www.virtualbox.org/wiki/Downloads>

Then, download ubuntu, which is one of the Linux distributions.

<https://ubuntu.com/download/alternative-downloads>

Finally, put them both together by following the steps on the ubuntu website to set up ubuntu on the virtual machine.

<https://ubuntu.com/tutorials/how-to-run-ubuntu-desktop-on-a-virtual-machine-using-virtualbox#1-overview>



Installing ROS – Noetic:

By following Noetic documentation to install ROS on ubuntu 20.04.

<http://wiki.ros.org/noetic/Installation/Ubuntu>

Due to a security incident, apt update fails to work, by stating that the key to a repo is unavailable.

The old key has been revoked as part of the measures to deal with a recent security incident.

Through research, I found an article that solves the problem by providing the new keys.

<https://answers.ros.org/question/325039/apt-update-fails-cannot-install-pkgs-key-not-working/>

```
bahaa@bahaa-VirtualBox: ~  
Get:1014 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libfreexl-dev amd64 1.0.5-3 [30.9 kB]  
Get:1015 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libproj-dev amd64 6.3.1-1 [1092 kB]  
Get:1016 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libgeotiff-dev amd64 1.5.1-2 [76.8 kB]  
Get:1017 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libhdf4-alt-dev amd64 4.2.14-1ubuntu1 [369 kB]  
Get:1018 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 libjson-c-dev amd64 0.13.1-dfsg-7ubuntu0.3 [46.9 kB]  
Get:1019 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libkcal-dev amd64 1.3.0-0build1 [933 kB]  
Get:1020 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 libopenjp2-7-dev amd64 2.3.1-1ubuntu4.20.04.1 [26.7 kB]  
Get:1021 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libspatialite-dev amd64 4.3.0a-0build1 [1387 kB]  
Get:1022 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 libwebp-dev amd64 0.6.1-2ubuntu0.20.04.1 [266 kB]  
Get:1023 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libxerces-c-dev amd64 3.2.2-debian1build3 [1094 kB]  
Get:1024 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 libzstd-dev amd64 1.4.4+dfsg-3ubuntu0.1 [286 kB]  
Get:1025 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 unixodbc-dev amd64 2.3.6-0.1build1 [225 kB]  
Get:1026 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libgdal-dev amd64 3.0.4+dfsg-1build3 [8093 kB]  
Get:1027 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libvtk7-jni amd64 7.1.1+dfsg-2ubuntu1 [4868 kB]  
Get:1028 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libvtk7-java amd64 7.1.1+dfsg-2ubuntu1 [2225 kB]  
Get:1029 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 x11proto-scrnsaver-dev all 2019.2-1ubuntu1 [2624 B]  
Get:1030 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 libxss-dev amd64 1:1.2.3-1 [11.9 kB]  
Get:1031 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 libvtk7-qt amd64 7.1.1+dfsg-2ubuntu1 [90.8 kB]  
Get:1032 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 python3-chor amd64 1.0.0-1.1build1 [20.5 kB]  
Get:1033 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 python3-lz4 amd64 3.0.2+dfsg-1build1 [31.2 kB]  
Get:1034 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-openssl all 19.0.0-1build1 [43.3 kB]  
Get:1035 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 python3-pyqrcode all 1.2.1-4 [30.3 kB]  
Get:1036 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-attr all 19.3.0-2 [33.0 kB]  
Get:1037 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-pyasn1 all 0.4.2-3build1 [46.7 kB]  
Get:1038 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-pyasn1-modules all 0.2.1-0.2build1 [32.9 kB]  
Get:1039 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-service-identity all 18.1.0-5build1 [10.7 kB]  
Get:1040 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 python3-snappy amd64 0.5.3-1.1build1 [16.9 kB]  
Get:1041 http://sa.archive.ubuntu.com/ubuntu focal/universe amd64 python3-trite all 0.2+ds-2 [7520 B]  
Get:1042 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-automat all 0.6.0-1ubuntu1 [27.5 kB]  
Get:1043 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-constantly all 15.1.0-1build1 [8244 B]  
Get:1044 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-hyperlink all 19.0.0-1 [33.5 kB]  
Get:1045 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-incremental all 16.10.1-3.2 [14.9 kB]  
Get:1046 http://sa.archive.ubuntu.com/ubuntu focal/main amd64 python3-zope.interface amd64 4.7.1-1 [85.2 kB]  
Get:1047 http://sa.archive.ubuntu.com/ubuntu focal-updates/main amd64 python3-twisted-bin amd64 18.9.0-1ubuntu0.20.04.2 [11.4 kB]  
554 kB/s 1min 55s  
^[[Kworking]
```

```
bahaa@bahaa-VirtualBox: ~  
Selecting previously unselected package libtini:amd64.  
Preparing to unpack .../0025-libtini_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libtini:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libatomic:amd64.  
Preparing to unpack .../0026-libatomic_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libatomic:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libasan5:amd64.  
Preparing to unpack .../0027-libasan5_9.4.0-1ubuntu1-20.04.1_amd64.deb ...  
Unpacking libasan5:amd64 (9.4.0-1ubuntu1-20.04.1) ...  
Selecting previously unselected package libsan0:amd64.  
Preparing to unpack .../0028-libsan0_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libsan0:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libubsan0:amd64.  
Preparing to unpack .../0029-libubsan0_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libubsan0:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libubsan1:amd64.  
Preparing to unpack .../0030-libubsan1_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libubsan1:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libquadmath0:amd64.  
Preparing to unpack .../0031-libquadmath0_10.3.0-1ubuntu1-20.04_amd64.deb ...  
Unpacking libquadmath0:amd64 (10.3.0-1ubuntu1-20.04) ...  
Selecting previously unselected package libgcc-9-dev:amd64.  
Preparing to unpack .../0032-libgcc-9-dev_9.4.0-1ubuntu1-20.04.1_amd64.deb ...  
Unpacking libgcc-9-dev:amd64 (9.4.0-1ubuntu1-20.04.1) ...  
Selecting previously unselected package gcc-9.  
Preparing to unpack .../0033-gcc-9_9.4.0-1ubuntu1-20.04.1_amd64.deb ...  
Unpacking gcc-9 (9.4.0-1ubuntu1-20.04.1) ...  
Selecting previously unselected package gcc.  
Preparing to unpack .../0034-gcc_4:9.3.0-2ubuntu2_amd64.deb ...  
Unpacking gcc (4:9.3.0-2ubuntu2) ...  
Selecting previously unselected package libstdc++-9-dev:amd64.  
Preparing to unpack .../0035-libstdc++-9-dev_9.4.0-1ubuntu1-20.04.1_amd64.deb ...  
Unpacking libstdc++-9-dev:amd64 (9.4.0-1ubuntu1-20.04.1) ...  
[#####]
```

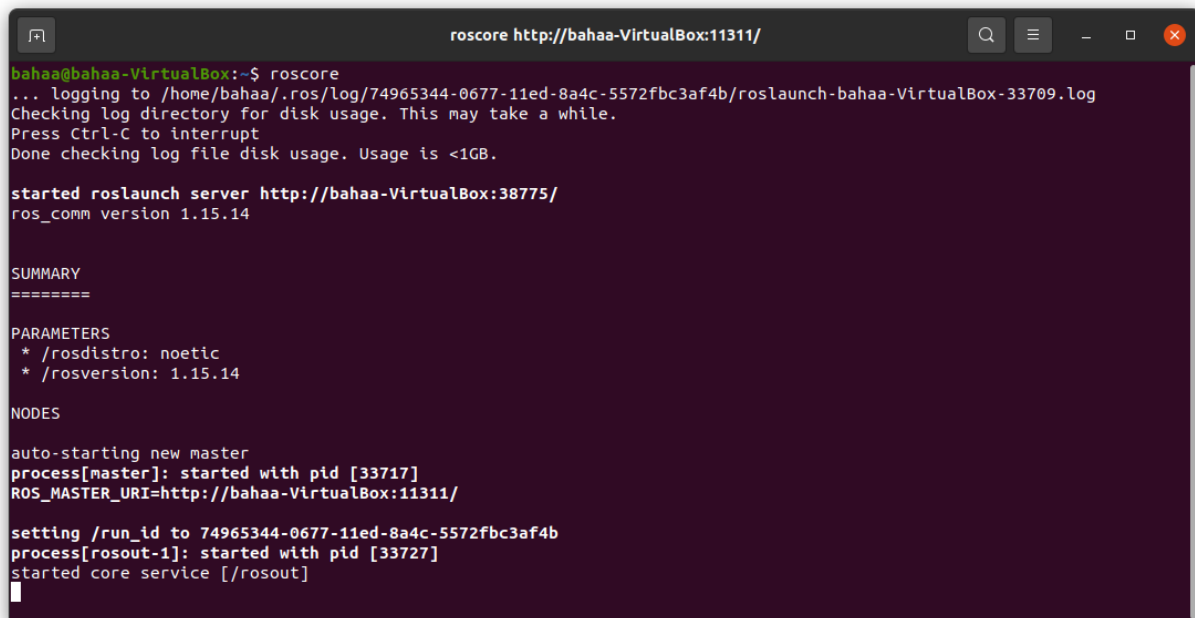
To run ROS, “roscore” must be typed every time in the terminal.

To avoid typing “ source /opt/ros/noetic/setup.bash ” every time opening the terminal, used the “ echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc ” command.

For future package installations, use:

sudo apt install ros-noetic-PACKGENAME

Now ROS Noetic is installed on Ubuntu 20.04 and running.

A terminal window titled "roscore http://bahaa-VirtualBox:11311/" with standard window controls. The terminal shows the execution of the "roscore" command. It logs the user to a specific directory, checks disk usage, and then starts the roslaunch server. The output includes a summary of parameters (rostdistro: noetic, rosversion: 1.15.14) and a list of nodes (auto-starting new master, process[roscout-1]). The terminal text is as follows:

```
bahaa@bahaa-VirtualBox:~$ roscore
... logging to /home/bahaa/.ros/log/74965344-0677-11ed-8a4c-5572fbc3af4b/roslaunch-bahaa-VirtualBox-33709.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://bahaa-VirtualBox:38775/
ros_comm version 1.15.14

SUMMARY
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PARAMETERS
* /rostdistro: noetic
* /rosversion: 1.15.14

NODES

auto-starting new master
process[master]: started with pid [33717]
ROS_MASTER_URI=http://bahaa-VirtualBox:11311/

setting /run_id to 74965344-0677-11ed-8a4c-5572fbc3af4b
process[roscout-1]: started with pid [33727]
started core service [/roscout]
```